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ABSTRACT

A discussion of computer use for teaching English as a second language (ESL) at the college level examines what computers can do in and outside the classroom and why ESL teachers should become acquainted with them. It begins by defining the various tools and tasks of the computer, including word processors, instructional courseware, database managers, spreadsheets, statistical packages, models and simulations, and graphics editors, emphasizing instructional applications. It also reviews the basics of the use of word processors for composing and printing. Computer applications for language learning are discussed, and direct and indirect uses of computers for classroom drill and activities are outlined. Information on computer etiquette and efficiency, evaluation of computer usefulness, sources of further information, and a glossary are included. (MSE)

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Computers and ESL in Higher Education

An introduction for teachers

Michael Barlow

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Why Computers?

Can computers teach language? The short answer is no—not by themselves. A future in which ESL teachers are replaced by computers is very unlikely, whatever technical advances are made, because a considerable amount of natural communication is fundamental to learning a language. In this regard it is revealing that young children who are cut off from normal language contact by, for example, being physically isolated and having deaf parents, cannot learn to speak their first language by watching television. From this we can conclude, not that there is something wrong with the language on television, but that for learning a first language communication with other human beings is essential. And for mastery of second language too, we can assume that natural communication plays a crucial role in developing real communicative competence.

Another reason why computers cannot replace language teachers is that computers do not understand the *full* structure of language—nor does any linguist. Furthermore, computers are unable to use syntax for communicative purposes. You can imagine the sort of difficulties which might arise with the first generation of domestic robots. For example, you might say to a robot, "Can you pass the salt?" After a long silence, during which the robot checks the different meanings of the verb *pass*, it replies, "yes"—but doesn't move.

From these drawbacks you might conclude that (1) there is no place for computers in the language classroom and (2) this will be a very short booklet. This is not the case. Computers are immensely useful; they have an important role in ESL classrooms today and their role in ESL instruction will increase, just as it will in our daily lives. The following pages contain several uses of computers of interest to ESL teachers; some of these will, I am sure, catch your interest and start you thinking about how you can best work *with* computers to help your students learn English.

As an antidote to the somewhat pessimistic view of computers presented above, I have listed a selection of reasons why ESL teachers should become acquainted with computers, both for their own benefit and for the benefit of their students.

1. Students using computers for writing projects can attain greater control over what they produce. The computer offers a whole range of new opportunities to improve the process of writing.

2. Computers will be helpful in your own work. You can use them for designing handouts, keeping track of student scores, or any number of day-to-day teaching tasks. Every teacher who uses computers comes up with some novel use for them, from using an information utility like CompuServe to producing a newspaper or comic strip.

3. You might have to help your students with the mechanics of using computers. You may also have to reassure them to some extent; they may have various apprehensions such as the "destruction of Moscow" fear. This syndrome occurs when students believe that by pressing the wrong key they will cause, if not the destruction of Moscow, then at least a breakdown in the machine.

4. Students who come to the U.S. from other countries are often interested in computers and "high technology." If you feel reasonably comfortable with the basic operation and main uses of computers, you will be able to capitalize on your students' interest.

5. Many students now own computers; recently some colleges have even required that students buy a microcomputer when they enroll.

6. A general knowledge of the role of computers in the academic and business world will help you to prepare your students for college study or a professional career.

7. As the price of computers falls, the availability of software specifically designed for ESL students will increase. We can expect to see the development of a range of computer-assisted language learning (CALL) programs in the near future.

8. More and more services are going *online*. (Words in italics are defined in the glossary.) For example, the searching of library catalogues using a computer is likely to become very widespread in colleges and universities.

9. Electronic mail is becoming an indispensable means of communication in education and industry. The fact that students may be able to send electronic mail across continents to their own countries may inspire them to become familiar with computers.

10. Computers are fun, especially when you can do something useful with them—whether it is drawing pictures, sending mail or writing a paper.

This booklet answers some of the questions that ESL teachers may have about computers. It also includes some guidelines that will help you teach students how to use computers.

If you have questions or comments, please write to me at the following address:

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What Can Computers Do?

Computers are all-purpose machines; they can be applied to diverse tasks, with new ones being found every day. At their most basic, however, all computer operations involve storing and processing information. The capacity to store data allows computers to keep track of information useful to you, such as research results, bibliographies, or data on students. The real power of computers, however, lies in their potential for processing or manipulating information. This capability enables you to revise your writing, perform complex numerical calculations, or produce animations.

Computers are often associated with *programming*. However, as you will see, you don't need to know how to write a program to use a computer; in fact, most computer users today know nothing at all about programming.

Writing a program involves writing a series of instructions in a computer language such as BASIC, Pascal or Logo. Because a program is a list of instructions, some people compare it to a recipe. The instructions in a program are written in a special language, the form of which varies from computer language to computer language. The vocabulary of these computer languages

often consists of English-like words, but the syntax is simple and severely constrained.

Computer languages can be thought of as a useful compromise between the language we use and the language that the computer uses.

Computer Tools

What has extended the use of computers to non-programmers in recent years is the development of programs called *applications* (or applications programs). Applications are similar in a way to the attachments that you can get with a vacuum cleaner or a fancy drill. These attachments allow you to transform the original machine into tools that perform different tasks. Similarly, an application program transforms the computer from a general purpose machine into a specialized tool. For example, to use the computer for writing, you invoke or load a word processing program, which makes the computer appear as though it were designed specifically to work with texts. If you wanted to use the computer for drawing, you would use a graphics application, and so on.

If you plan to do something physical, like build a wall or dig a ditch, then the computer is not the machine to use. I assume, however, that as a teacher, many of your tasks are concerned with information processing and, to use another grand term, symbol manipulation—the essence of computing.

How computers and people can work together to accomplish information-related tasks is something that we are just beginning to explore. Just as it took a while for people to fully exploit film technology—early films were more like recordings of traditional theater—so it will take time for us to learn how to use computers fully. We are making good use of computers today, but it is reasonable to assume that our present use of computers is constrained to a great extent by old habits.

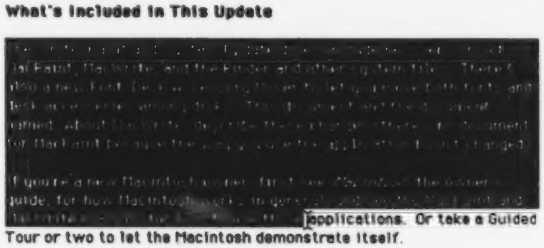
Here is a quick guide to some of the common applications (or *software*) used in business and education. These include:

- word processors
- instructional courseware
- data base managers
- spreadsheets
- models and simulations
- communications utilities
- graphics editors

Word processors

Word processing (also called text editing) allows you to use the power of computers to store and transform written text. After opening (i.e., starting) a word processor or editor, you are presented with a screen image which contains a blank area on which you can enter text by typing at the keyboard. Once text is entered, it can be saved as a *file* so that you can retrieve it later. In addition, you can print the file to get a paper copy or *hard copy* of your writing.

A more powerful capability available to you comes from commands that modify what you have written. For example, the text in the highlighted area (the black box) below can be transformed in several ways: It can be deleted, copied, moved, or altered in other ways.



More information on word processing appears in the section on Writing and Computers.

Instructional courseware

Instructional software called *courseware* refers to programs designed to teach particular skills or knowledge. Although ESL courseware programs often lead the student step-by-step through specific areas of grammar (such as subject-verb agreement), there are other skills, such as reading and listening comprehension, that are also amenable to computer teaching. (See Ahn 1985 and Wyatt 1984 for a discussion of the applicability of computer instruction to various language skills.)

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Three choices are open to you when it comes to obtaining courseware. You can (1) use ready-made software; (2) write courseware using an *authoring language*, such as PILOT; or (3) for the enthusiast, write courseware programs yourself using a computer language.

If you are thinking of buying ESL courseware and are not sure about how to evaluate different programs, you can get some help from guidelines on buying software published by ERIS and other organizations.

A good source of material for schools on low budgets is *public domain* software. Public domain software is produced by teachers and computer enthusiasts, usually for their own benefit initially, and then made available to others. The advantage to you is that public domain software is more or less free; however, you have to track it down. To get you started, some sources are given in the section entitled Where to Get More Information.

Authoring languages allow you to produce a series of modules or frames that make up a mini-course. The authoring program will prompt you for information such as the number of frames, the text or questions for each frame, and a response for each answer given by the student. Responses might consist of text, such as "Right!" or the presentation of a new frame. The authoring software then takes all the information you have entered and constructs a course for the student to use.

The advantage of using an authoring language is that you don't have to do any programming and so can produce useful material in a short time. The disadvantage, of course, is that you have to work within a set format.

Writing courseware is a very time-consuming process. To write *good* courseware takes even longer. However, if you are interested in writing small, custom-made programs for your students, Ahmad (1985) and Higgins & Johns (1984) give an excellent introduction to the topic.

The main types of software available for ESL are discussed in the section on Computer-Assisted Language Learning.

Data base managers

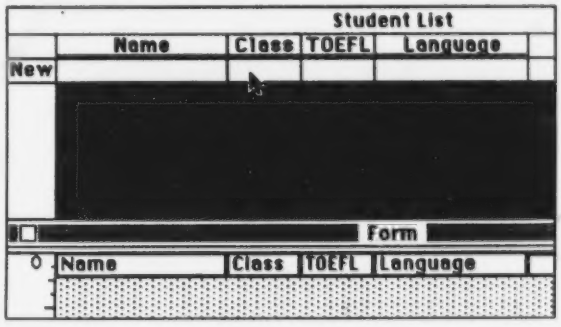
A *data base* is simply a store of information in a standardized format. Everyday examples of traditional data bases include appointment books, address books and bank statements. An academic version of a traditional data base might be a shoe box full of index cards.

A computer data base is a handy way of storing large amounts of information in a way that allows rapid retrieval. Programs called *data base managers* allow you to sort or find data very easily.

An increasingly common example of a computer data base is an online library catalogue. In a traditional card catalogue, you have to search for books or journals using subject headings, titles or names of authors. With a computer, on the other hand, you can use whatever information you have. Even if you only know a couple of words from a title, you can still perform a search. You can also search for an item using, for example, a combination of subject and author's name.

To set up your own data base, you must first define its structure. This involves designing an electronic form. The completed form contains a list of headings, for example, NAME, ADDRESS, etc. If there are five headings, then each entry (or *record*) will have five slots (called *fields*) to be filled.

A sample form for an ESL teacher's data base (produced using Microsoft File) is shown below. The lower part of the screen shows the form; the upper part is the actual (empty) data base.

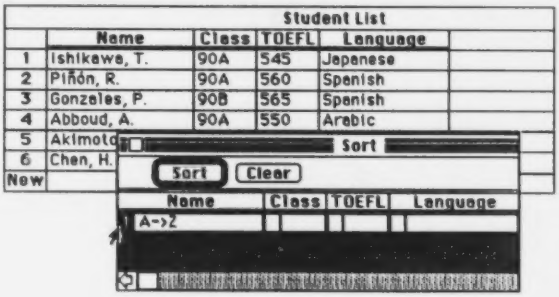


After designing the form, you can enter the data base information.

Student List

	Name	Class	TOEFL	Language
1	Ishikawa, T.	90A	545	Japanese
2	Piñón, R.	90A	560	Spanish
3	Gonzales, P.	90B	565	Spanish
4	Abboud, A.	90A	550	Arabic
5	Akimoto, F.	90B	555	Japanese
6	Chen, H.	90B	540	Chinese
New				

Once entered, the information can be easily updated or revised if necessary. In addition, if you find that you need more fields, you can modify the form. The benefit of using a computer data base becomes obvious when you want to quickly search for a particular piece of information, or rapidly sort all the records according to some chosen order. For instance, you could first sort the data base by name. In the example below, the records are going to be sorted in alphabetical order of the name field.



The records are sorted by the computer and redisplayed.

Student List

	Name	Class	TOEFL	Language
1	Abboud, A.	90A	550	Arabic
2	Akimoto, F.	90B	555	Japanese
3	Chen, H.	90B	540	Chinese
4	Gonzales, P.	90B	565	Spanish
5	Ishikawa, T.	90A	545	Japanese
6	Piñón, R.	90A	560	Spanish
New				

You could also sort the records based on some other field, such as TOEFL score. Here the computer has resorted the records in increasing order of TOEFL scores.

Student List

	Name	Class	TOEFL	Language
1	Chen, H.	90B	540	Chinese
2	Ishikawa, T.	90A	545	Japanese
3	Abboud, A.	90A	550	Arabic
4	Akimoto, F.	90B	555	Japanese
5	Piñón, R.	90A	560	Spanish
6	Gonzales, P.	90B	565	Spanish
New				

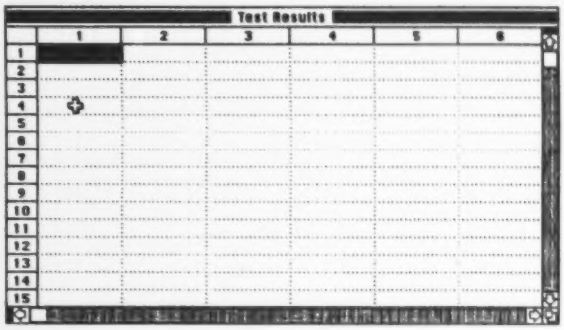
The computer is able to quickly and accurately rearrange the records in response to your specifications.

Some data base managers can select and present any specified portion of the records. For example, you might retrieve all the records in which the TOEFL scores are between 400 and 500.

Spreadsheets

Spreadsheets are programs that allow you to store and manipulate numerical, often financial, data. Because spreadsheets are such an improvement over the "paper and pencil" ledger systems used by businesses until just a few years ago, their development gave an important boost to the sale of early microcomputers.

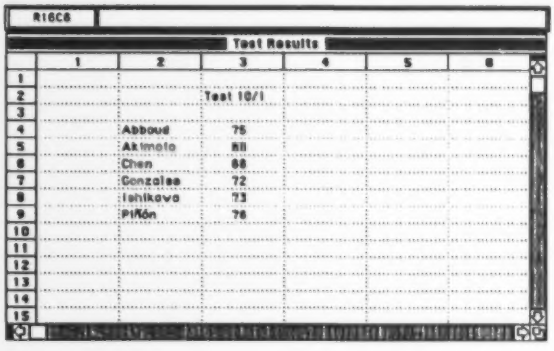
All spreadsheet programs, such as Lotus 1-2-3, Multiplan, and Excel, follow a standard format. The layout, as you can see below, consists of a large sheet divided into rows and columns. Thus the whole spreadsheet is made up of boxes or *cells*, which are labelled according to their row and column numbers. Here, in this Multiplan spreadsheet, Row 1, Column 1 (R1C1) is highlighted in black. The plus sign (+) is the spreadsheet version of a pointer; it allows you to select a particular cell.



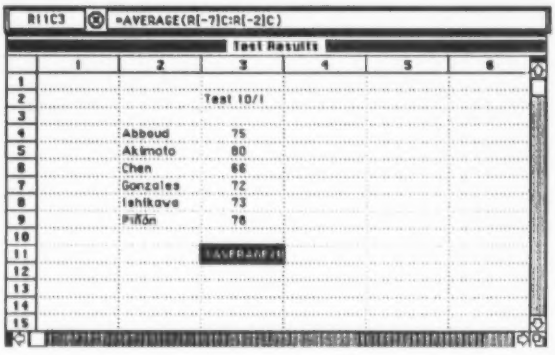
In any given cell you can enter one of the following:

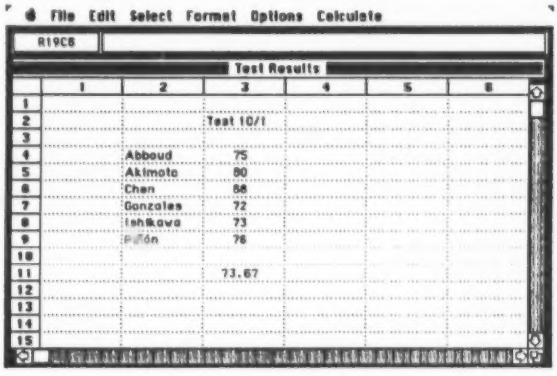
- a word (e.g., a heading)
- a date
- a number
- a formula

Each cell can contain a piece of information (or *value*). Cells can have values that are names, dates or numbers. For example, you might set up a spreadsheet with a list of student names entered in column 2 and their test scores in column 3. In this example, the spreadsheet is simply being used as a convenient way of storing information.



What makes spreadsheets so powerful, however, is their ability to work with formulae. If you enter a formula for a given cell, then the computer will calculate the value for the cell by following the instructions in the formula. In defining a formula, you can refer to the values contained in cells anywhere in the spreadsheet. In this example, you might enter a formula for cell R11C3 that simply finds the average of cells R4C3 through R9C3.





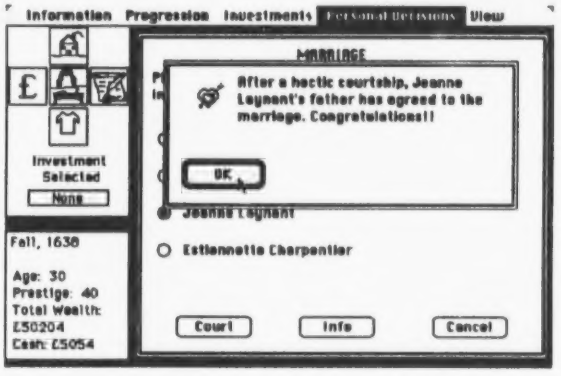
If you find that you made an error in entering one of the student's scores, you can simply correct the value. But what is really wonderful is the fact that this modification causes the average, that is, the value in cell R11C3, to be recalculated automatically.

Statistical packages

It is possible to use spreadsheets for statistical analysis; but there also exist several "canned" or pre-formulated programs that allow you to undertake statistical analyses of your data. The fact that you don't have to perform all the calculations yourself has several advantages. These programs are not only fast, but they also reduce the chance of error. In addition, using a statistical package allows you to carry out sophisticated analyses with relative ease.

Models and simulations

An indication of the power and usefulness of computers is that they can be used as models or simulations of "real world" events. Some examples of this type of application are computer games, flight simulators, financial models, and models of natural processes. For example, the screen below comes from a game called *The Would-Be Gentleman* which is based on life in the time of Louis XIV. By trying to increase their wealth and prestige, students playing the game learn about protectors, "good marriages," and investments in 17th century French society.



The Would-Be Gentleman , which is used in a history course at Stanford University, is available from Kinko's Copies.

Models and simulations are very useful for teaching; they allow students to observe, and perhaps manipulate, representations of processes that in nature (or a laboratory) are too small/large/slow/fast/expensive/dangerous or inaccessible for students to witness at first hand.

The linking of computers and videodisc players, although new and expensive, holds considerable promise for ESL students and teachers. Computer/videodisc systems allow portrayal of slices of "real life" (via the videodisc) while permitting student interaction (via the computer).

Communications utilities

One of the growing uses of computers is for communication. Electronic mail is used extensively by educational and business organizations as an alternative to the postal service and the telephone.

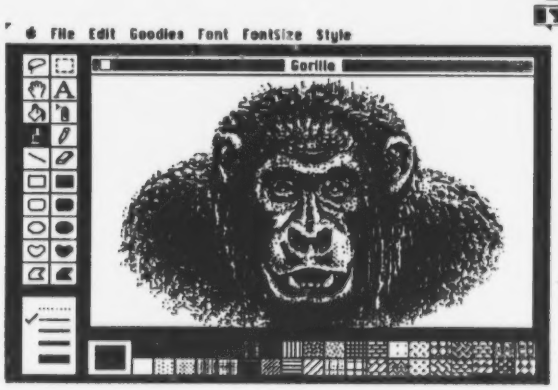
One advantage of electronic mail is that a message can be sent to many people just as easily as it can to one person. For example, I have set up mail files allowing students to send mail to all the members of their class and even to everyone in their program.

Electronic conferencing extends electronic comunication even further. In electronic conferences, several users are linked together by a computer network. At present, businessmen and computer enthusiasts are the main users of electronic conferences, but the idea has potential applications in ESL teaching as well.

The growing area of computer communications is served by several companies called information utilities. These companies, which include CompuServe and The Source, provide a range of services to their customers (who are charged according to the length of time they are signed on to the system). Facilities provided by such companies, in addition to electronic mail and conferencing, include business information, such as the Dow-Jones index; up-to-date news information; public domain software; access to encyclopedias and data bases of reference material; and special interest group "meetings."

Graphics Editors

Graphics editors enable you to produce high-quality drawings and diagrams with comparative ease. Graphics editors harness the computer's power to make the drawing of squares, circles, and straight lines very simple. Diagrams and pictures containing geometric shapes can be drawn easily; however, drawings such as the picture below require more skill. In fact, this MacPaint drawing is from a commercial disk called Click Art, which contains a variety of "paintings."



Writing and computers

Although the mechanics of writing a paper is made easier by the computer, the difficult task of organizing and presenting ideas remains. Since knowing how to use a word processor is not the same as knowing how to write a paper, you will still have to teach basic writing skills to your students.

Some benefits to you as a teacher of having students who use a computer are that the final product looks good and is easy to read. Also, the students themselves are pleased to see a computer printout of their work; it looks real or professional in some sense and makes them eager to continue working with the computer and hence continue writing.

One useful feature of some word processors is that they allow users to enter comments *about* the text being written. The comments may be written by students as questions or reminders to themselves, or they may be added by the teacher. These comments are distinguished from the rest of the text by special symbols such as % or .. placed at the beginning of the line containing the comments. The comments are visible on the screen, but they do not appear in versions of the file that are printed out.

A major benefit of word processors for you as an ESL teacher is the fact that your students can easily modify their work in light of your instruction and comments. Nothing is carved in stone when it is written on a computer. Revisions, even major ones, can be made quickly and easily.

Writing on a computer brings out the dynamic aspect of writing; you can develop ideas, experiment with different constructions, and try out different words and phrases. This facility for revising and experimenting with text indicates that the computer can be exploited as a teaching tool. Working with the computer allows the teacher and students to explore together the process of writing.

Another plus comes from the fact that the student can write the different parts of a paper in any order. The fact that it isn't necessary to start off by writing the introduction may help the student to get started with the writing. The student can work on the easier parts first and try the harder parts once he or she has built up some momentum.

Computers also give the writer a series of options regarding the style of presentation of your writing. Choices commonly available include type size (small to large); type style (**bold**, *italic*, etc.); single, double or triple spacing; and size of margins. You may also *justify* the text, that is, make the right-hand side of the text appear straight rather than "ragged." Justification gives a professional look to writing, because it makes the text look more book-like. The disadvantage of justified text is that it can make the text more difficult to read, since there are often large uneven spaces between words. Below are examples of non-justified text and justified text.

> You may also *justify* the text, that is, make the right-hand side of the text line up in a straight line. Justification gives a professional look to writing, because it makes the text look more book-like.

> You may also *justify* the text, that is, make the right-hand side of the text line up in a straight line. Justification gives a professional look to writing, because it makes the text look more book-like.

Styles of writing

What is the best way to write? No one knows; in fact, there is probably no single method that is best for everyone. Different people have different styles; however, the computer can accommodate them all. Here are some styles of writing:

1. **Sit and write** Some people like to produce a fairly complete work before looking at it for purposes of revision. Some of these writers who don't want their critical faculties to interfere with their creative flow turn down the brightness on the monitor, making the screen (and their writing) invisible.

2. **Outline** One popular way to write is to first produce an outline in order to sketch out a basic structure for a paper. Text is then added to flesh out the outline. Additionally, items in the original outline may become section headings. There are certain programs, described at the end of this section, that are specially designed to help you produce outlines.

3. **Multiple drafts** For some writers, a paper evolves as it is written. Such writers produce one draft, leave it for a while or show it to others for comments, then they write another draft, perhaps quite different in form. The computer allows you to revise or completely rewrite what you have written.

4. **Cut and Paste** By writing about each idea associated with a paper topic, some writers produce chunks of fairly self-contained text. Only when these parts are written does a logical structure for the paper emerge. At this point, the writer rearranges the different parts (adding appropriate modifications such as transitions) to produce the final paper.

Elementary computer skills

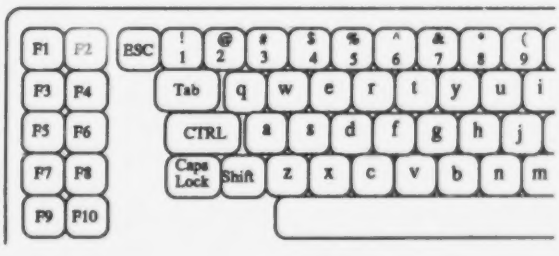
Since learning to use a word processor (or text editor) takes some time and effort, ESL students are faced with two tasks: acquiring computer skills while at the same time producing an acceptable English text. This section is designed to help you teach word processing skills to your students.

Skills which must be mastered by computer novices in their first use of computers for word processing include the following:

1. Using a keyboard
2. Giving commands to the computer
3. Using *floppy disks* with a microcomputer
4. Calling up the word processing program (and a file or document)
5. Entering text
6. Saving text
7. Modifying text, which involves (a) moving the cursor and *scrolling* the screen, (b) inserting, *deleting* or moving words or phrases
8. Saving the file and leaving the editor
9. Printing the file

Students first need an introduction to the keyboard, which differs from a standard typewriter in some respects. Some foreign students may never have worked with typewriters and so will need extra help with keyboarding skills. Once they have become familiar with the layout and use of the keyboard, they will be ready to communicate with the computer.

A second problem that novices face is where to look on the screen. There is an obvious bias, for most computer novices, to look to the top left of the screen and start scanning left to right down the screen as though reading a printed page. Experienced users, on the other hand, take in the pattern of the screen as a whole and focus very quickly on the part of the screen which contains the information they need.



Although it is not clear to what extent screen orientation can be taught, there are two tactics that you might try. One is to get the student to focus on the *cursor* since the most pertinent information is usually placed next to it. The cursor is an underline character or rectangle (often blinking) that indicates where text typed at the keyboard will appear on the screen.

The second tactic is to point out to the student those areas on the screen that are "hot spots" for the particular program being used. Each program uses the screen in a consistent manner and presents information to the user in a standard way. For example, the program may display one sort of message at the bottom right of the screen and another sort at the top right.

In addition to the mechanical problems described above, there are some conceptual difficulties for beginners (both teachers and students). These include:

- distinguishing commands from text
- giving the right command in the right place
- distinguishing temporary from permanent memory
- using "word wrap"
- being aware of the various invisible characters

I will briefly discuss each of these.

Distinguishing commands from text

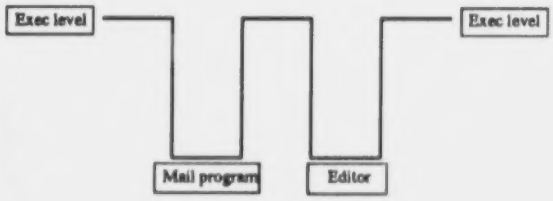
The keyboard is used for entering both text and commands. How does the computer distinguish these two? For example, if a particular instruction is given to the computer by typing command **a**, how is this command **a** distinguished from the letter **a** which occurs as part of the text?

One solution is to have two different modes: a text mode and a command mode. In this case you change from one mode to the other by pressing a particular key. To give the instruction command **a**, you must switch to command mode; you then simply press the **a** key. Another common solution is to have special *command keys* that are used in conjunction with the letter keys to give instructions to the computer. One command key is called *control* (CTRL). To give the command "control a" (written CTRL A or ^A), the control key is held down with one finger and the **a** key is tapped with another.

Giving the right command in the right place

Experienced computer users have a mental picture of the organization of a computer. Beginners lack this knowledge and often "get lost." It is easy to become disoriented because there are different levels of organization within a computer system. Once you have learned the basic commands and organization of your computer system you can find your way from one level to another and execute the commands appropriate for each level.

The diagram below represents the path of a student who starts at the "exec" or "top level" and then enters a mail progam. After working in the mail program, the student quits, returns to the exec level, and enters a word processing program. After quitting, the student again returns to the exec level.

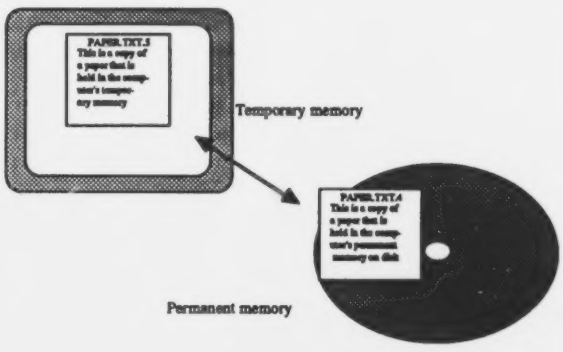


There are other ways in which experienced users may visualize a computer system, for example, as a series of concentric circles or as a branching, tree-like structure.

Distinguishing temporary from permanent memory

The text visible on the screen is in temporary memory; that is, it relies on the power of electricity to keep it there. If something happens that breaks the connection, for example, if the computer is turned off, the text will be lost. In order to be retained, all work must be transferred to a permanent storage medium: some sort of magnetic material such as a tape or floppy disk. The idea that a file exists in two (possibly different) forms—what is seen on the screen and

what resides on a magnetic disk—is difficult for beginners to appreciate.



Using wordwrap

Word processors are designed so that it is not necessary to press the *return key* at the end of each line. The computer itself moves the word onto a new line when the text extends beyond the right-hand margin. The return key is only used at the end of a paragraph or to produce blank lines; it is not used to produce double-spacing.

Invisible characters

There is a family of invisible characters which appear on the screen as blank space. These characters include:

- return
- tab
- space

The invisible characters must be distinguished from the absence of any character at all. For example, there is a distinction between moving the cursor and pressing the space bar, even though the effect on the screen appears to be the same. The latter enters real characters into the text—spaces.

Intermediate computer skills

After mastering the basics, students should be encouraged to move on to a more powerful (and thus more efficient) use of the computer. Students with intermediate word processing skills are able to:

1. Control the layout of a paper—margins, spacing, etc.
2. Move quickly and efficiently around a file, using a variety of cursor movement commands.
3. Use a range of powerful commands, rather than repeating simpler commands.
4. Use search/replace commands.
5. Transfer blocks of text within a file and from one file to another.

Adjunct programs for writers

There are several text handling programs, used in conjunction with word processors, that ESL students may find useful. These include:

- dictionary/thesaurus programs
- outliners
- formatters
- spelling/grammar checkers

Dictionary/thesaurus programs

There exist a number of dictionary and thesaurus programs that can be used with word processors. These programs let you look up words or synonyms without interrupting your work at the computer.

Outlining programs or idea processors

Outlining programs make it easy for you to develop an outline for a paper. You simply write a list of headings that cover the the main points of your paper. To elaborate on this structure, you add subheadings and subsubheadings until you cover the subject matter you intend to treat. In addition, the text body can be entered, just as it can with an ordinary word processor.

+ Dictionary/thesaurus

+ Outliners
  - construct an outline
  - add subheadings
    - add subsubheadings

+ Formatters

The advantage of such programs (e.g., Think-Tank) is that they allow you to develop an outline easily. It is simple to change the order of headings and to change headings from one level of the structure to another. If you like to work on the structure of a paper and manipulate headings and subheadings before starting to write, you will find these programs useful.

Formatting programs

Formatting programs give you greater control over the form and style of a paper. You may be able to add section headings, a table of contents, an index, footnotes, special symbols like∑, ©, and ∞, and non-English characters such as å and ç. In addition, a formatting program gives you considerable control over the overall appearance of the page.

It is not necessary to use formatting programs at all, since the output of word processing programs is adequate for most uses. However, many people experience a rise in their expectations when it comes to the appearance of their computer-generated documents; formatting programs satisfy these raised expectations.

There are two stages involved in producing a text when you use a formatting program. First, you write the paper using an editor, embedding special formatting commands in the text as you go. In this example from Scribe, two formatting commands are given: one for a section heading and one for italic text.

```
@begin(Heading)
Formatters
@end(Heading)

The use of @i[formatters] is growing in
```

Once you have completed the document, you run the file through the formatting program which produces a formatted version of your document in a separate file. The formatted file is then printed out.

1. Formatters

The use of *formatters* is growing in

Spelling/Grammar checkers

A spelling checker is a useful aid in producing a paper free of spelling and typing errors. A spelling checker will take a given file and search through it word by word, checking each word against the entries in its dictionary. If it finds a word in your file that it doesn't recognize (because the word isn't in its dictionary), it will mark the word in some way. You can then change any misspelled words in your document.

More sophisticated spelling checkers may, in addition to finding misspelled words, provide one or more "guesses"; that is, the spelling checker will give a list of words from its dictionary that are similar to the word in your file. These spelling checkers may be able to automatically replace the misspelled word in your file with a word that you select from the list of choices.

Since a spelling checker has no information about the grammatical and logical connections between words, it cannot check style, development of ideas, coherence or grammar. In other words, a spelling checker will find no fault with a sentence such as:

An information can bee obtain.

There do exist some grammar checkers designed to use structural information as a clue to good style. Such programs may check the mean length of sentences or the number of prepositions and passive verbs in the text and use this information as an indicator of possible writing problems. However, since good writing is closely tied to good thinking, these structural indicators can only provide limited assistance in improving a text.

Computer-Assisted Language Learning

If we take a wide view of computer-assisted language learning (CALL) as *any* use of computers that aids language learning, we can distinguish two types of CALL: direct and indirect.

Direct CALL programs are designed to teach some aspect of language, such as subject-verb agreement or the use of articles. The computer program, which contains somewhere within it the source of the intended learning, acts as a language instructor.

In indirect CALL activities, on the other hand, the computer merely facilitates language learning; the actual source of language learning comes from *outside* the computer program. For example, by using a word processor or communications program, students are not trying to get knowledge of English from the computer; they are simply using the computer as a tool that makes their tasks easier. In indirect computer-assisted language learning, the computer acts as a facilitator or motivator.

Direct CALL

The computer as an instructor has several useful qualities. These include:

- patience (or lack of impatience)
- accessibility
- individualized attention
- interactivity

Computers are completely devoid of emotion—though they may inspire extreme emotions in people—and so it is somewhat misleading to say that computers are patient. However, as far as students are concerned, the computer has infinite patience.

Computers are potentially available twenty-four hours a day, seven days a week. In reality, however, students may have to wait to use a computer. It is probably a fundamental law of computing that if there are i computers, the demand will be for $i+1$.

An advantage often claimed for computers is that they provide individualized attention. This is true in that each individual student works directly with the computer at his or her own pace. However, we are not yet very good at designing programs that respond to the needs or special problems of individual students. To respond to the individual needs of students, CALL programs would have to incorporate a model of the student's knowledge, so that the programs could present material to extend or modify the student's knowledge.

One simple and useful way of individualizing software is to design programs that pretest students to assess their knowledge and then present them with exercises at an appropriate level.

It is possible to use computers in the same way as we use clocks: wind them up (or put in a battery) and let them run. However, computers are more often used interactively; there is a continual dialogue between the user and the computer. The user enters a command and the computer responds in some way, then the user responds to the computer's response, and so on. The advantage of this interaction is that the user keeps close control of the computer and gets immediate feedback.

To highlight some of the advantages and disadvantages of direct CALL, let us examine one simple type of CALL program: a computerized cloze test. Cloze tests, which are texts in which every nth (e.g., 7th) word has been omitted, can be used for both testing and instructional purposes.

Some advantages of a computerized cloze test are that:

- cloze tests can be generated automatically
- the deletion rate can be specified by the student or teacher
- results can be assessed automatically
- records of student performance can be kept
- assistance can be provided if necessary

Since the answer to a cloze test is contained within the program, the computer can check the answer typed in by the student. In addition, the computer can give clues on request for any item that the student is working on. These clues are

based on structural information about the missing word such as its first letter or the total number of letters in the word. Other kinds of clues, such as the part of speech of the missing word, cannot be derived by the computer by simply examining the word. To provide this kind of information, a dictionary program would have to be incorporated.

However, suppose that we would like the cloze test to accept not just the word missing from the original text, but any answer deemed appropriate by a native speaker. To determine whether the student's responses are in fact suitable, the computer would have to know about morphology, syntax and semantics. In addition, and perhaps most difficult of all, it would need some knowledge of the way the world is organized. Research on all these topics is underway, but it will be a while before useful ESL software contains enough information to judge the appropriateness of students' responses.

The point of this discussion of cloze tests is simply to show that computers can perform well on some tasks and terribly on others. I have talked about the limitations of computers because it is often the case that people who don't know anything about computers overestimate their capabilities. However, I hope that once you understand these limitations you will half forget them and consider computers as machines of infinite potential.

Direct CALL software can be divided into three types:

- drills
- tutorials
- microworlds

Drill programs

The easiest CALL programs to write are those in which the student is drilled in some aspect of grammar. The student is presented with some task such as supplying a correct verb form. For example:

Type the correct form of the verb:

One of the students _____ (BE)

leaving tomorrow.

The advantage of such programs is that the student can practice some weak area of grammar with a tireless teacher. It is also possible for the computer to use "mix and match" techniques to generate novel sentences or drills, thereby avoiding repeated use of the same material.

A disadvantage of drill programs is that the task is removed from day-to-day communication. However, drill programs do not have to be so obviously an exercise as in the example given above. More graphic, interactive programs are possible with computers like the Apple Macintosh. Such programs make it easier for students to "suspend their disbelief" at the unreality of the task at hand.

Tutorial programs

The aim of tutorial language programs, which range from programmed learning sequences to demonstrations, is to give the student explicit instruction in particular grammatical topics or communicative skills.

A tutorial program consists of a number of frames or mini-lessons linked together. Each frame contains some text (an explanation and/or question) and perhaps an illustration. By working through these frames in a step-by-step manner, the students build up their knowledge of some aspect of English. The frames often follow one after another in a linear fashion. Alternatively, there may be some testing of the student's knowledge during the tutorial that determines which frame is subsequently presented to the student. In this case, the student follows a branching path through the tutorial.

Since the computer has the ability both to store a considerable amount of information and to transform it, the potential for good tutorial programs is considerable.

Microworlds

Microworlds include games, models and simulations. These all have some characteristics of the real world, but they are bounded in some way. The setting of bounds means that the student can be given some freedom to explore and try things out. A good ESL program gives the student a feeling of freedom and control, while at

the same time being structured enough for the student to learn something about English.

GAMES set up a microworld in which a particular set of rules applies. In direct CALL games, the winning or completion of the game is linked to progress in some aspect of English grammar or vocabulary.

MODELS may contain some essential properties of a real phenomenon. For example, the screen below, taken from a Russian language program under development, illustrates a model in which objects and actions labelled in Russian are also represented graphically. The students use this graphics-based communication system to help them produce Russian sentences.

SIMULATIONS are set up to mimic aspects of the real world. Non-computerized simulations are well-known in the classroom. For example, a group of students acting out a restaurant scene constitutes a simulation. Computer simulations can be more sophisticated and can provide individualized, interactive language practice. As with all computer software, however, most of the good programs require a considerable investment of time and money.

As I mentioned before, there is great promise in linking computers to other devices such as videodisc players. In the future, our students may be able to practice English in a restaurant setting by using a computer linked to a videodisc player. The choices that the student makes will influence the scene that unfolds. This sort of program may help ease the transition from practice in the classroom to use in the outside world.

Indirect CALL

There are many types of classroom activities that use computers in an indirect manner. Any of the uses of computers surveyed at the beginning of this booklet can be incorporated into ESL classes. ESL teachers have used computers in the following activities:

- producing newsletters
- working with programming languages like Logo
- designing greeting cards
- sending electronic mail

Computers in the Classroom

Teachers who have computers in their classrooms will need to work out answers to certain organizational questions, such as how to:

- instruct the students in computer use
- control access to computers and printers
- regulate the use of limited software resources
- monitor the students' work
- keep track of software programs and, possibly, students' disks
- protect the more sensitive parts of the computer, e.g., disk drives
- maintain security of hardware and software
- obtain supplies such as paper and ribbons for the printers
- deal with noise from printers
- cope with hardware breakdowns (Is there a service contract?)

Instructing a large group in how to do something on the computer often poses logistical problems. One solution is to connect a projector such as a Limelight to the computer. This allows the students to see the image on the teacher's monitor projected onto a large screen. However, since the teacher's keyboard is not visible to the students, he or she will have to be explicit about the commands being given.

Computer etiquette

Since the use of computers in an American educational setting will be new to many of your students, you will have to tell them some rules of computer etiquette. Foreign students may not

know the conventions concerning term papers at American colleges, for example, the fact that papers should be double-spaced, with the title centered and with adequate margins. Footnote numbers can usually be raised (by treating them as superscripts) if required. As a courtesy, students should remove the separable sides of the page containing tracking holes, separate the sheets, and staple them together.

Some students may be so taken with the capabilities of computers that their work is overloaded with a variety of different fonts, type styles and font sizes. If the work is an invitation to a party or a ransom demand, then this variety may be appropriate. However, for academic work, a more restrained style is conventional (and less likely to offend professors).

A potential minefield for foreign students is sending electronic mail. This is a new form of communication and there aren't any books on how to do it without causing offense. I suggest that when students send mail to professors (or people they don't know well) they should (1) send a message that looks like a traditional note, with the name of the recipient at the top and the name of the sender at the bottom, and (2) avoid the use of messages that flash directly onto the screen of the recipient. The normal mail program should be used, so that the recipient can read the message at his/her leisure.

Computer excuses

There are a variety of new problems associated with computers which make excuses such as "the dog ate my paper" out-of-date. New excuses include:

—The computer's down (i.e., not working).
—There are so many students doing the assignment that I can't get access to the computer.
—I accidentally erased my file.
—My disk got scrambled (i.e., the files on my disk cannot be read by the computer).
—The printer is jammed.
—The dog ate my disk.

The number of such excuses will be reduced if the students start their assignments in good time, make back-up copies of their files, and keep a hard copy of their papers.

Evaluation

As a final thought, let us remember that it is important to assess the effectiveness of computer technology in language teaching. Two questions that must be addressed when considering the use of computers in the classroom are:

- Do the benefits of using the computer make it worthwhile for the student?
- Is the computer the best medium for the task?

When you ask students to do some work using a computer, you are asking them to complete two tasks: one is to use the computer, the other is to complete the task. The (direct or indirect) benefit for the student of accomplishing the latter must outweigh the time and energy spent on the former.

If the student is presented with screenful after screenful of text which he or she must read, then the wrong medium is being used, since it is much more difficult to read from a computer screen than from a page of a book.

No doubt we will all make mistakes in using computers in ESL classes: underestimating the logistical problems and overestimating the benefits of using computers. Nevertheless, the potential exists for extensive and creative uses of computers in TESL. I hope that the material presented in this booklet has started you thinking about how you can take advantage of computers in your courses.

Where to Get More Information

The following list contains a partial selection of organizations and journals that might be of interest to teachers of ESL.

CALICO (Computer-Assisted Language Instruction Consortium), 229 KMB, Brigham Young University, Provo, Utah 94602. (CALICO in addition to producing a journal has a data base of software)

C.A.L.L. Digest, c/o I.C.C.E., University of Oregon, 1787 Agate St., Eugene OR 97403.

Clearinghouse for ESL Public Domain Software,

Gordy 201, Ohio University, Athens, Ohio 45701.

The Computing Teacher, International Council for Computers in Education, University of Oregon, 1787 Agate St., Eugene, OR 97403-1923

CompuServe Information Service, 5000 Arlington Center Boulevard, P.O. Box 20212, Columbus, OH 43220. (800) 848-8990

ERIC (Clearing House on Languages and Linguistics), Center for Applied Linguistics, 1118 22nd Street, N.W., Washington, D.C. 20037.

ERIS (Educational Resources & Information Services), P.O. Box 3704, Eugene, Oregon 97403.

The Source, 1616 Anderson Road, McLean, VA 22102. (800) 336-3300

TESOL, 1118 22nd St., N.W. (Suite 205), Georgetown University, Washington, D.C. 20037.

TESOL CALL Interest Section produces CALL-IS newsletter. CALL-IS, Learning Laboratories, Concordia University, 1455 De Maisonneuve West, Montreal, Quebec H3G 1M8, Canada

Additional sources of information are local user groups and special interest groups. If there isn't a CALL special interest group in your area, you might consider starting one.

Selected Bibliography

Ahmad, K., G. Corbett, M. Rogers, & R. Sussex. 1985. *Computers, language learning and language teaching.* New York: Cambridge University Press.
An excellent introduction to the field of CALL.

Barlow, M. 1987. *Working with computers: computer orientation for foreign students.* San Francisco: Athelstan.
Aimed at foreign students, this book covers the basic uses of computers for academic work: writing papers, searching online data bases, etc.

Daiute, C. 1985. *Writing and computers.* Reading, Mass: Addison-Wesley.
Although Daiute's book is not directed at ESL, its thorough exploration of different aspects of writing and computers is relevant for ESL teachers.

Geoffrion, L. & O. Geoffrion. 1983. *Computers and reading instruction.* Reading, Mass: Addison-Wesley.
A very good introduction to the use of computers in the teaching of reading.

Higgins, J. & T. Johns. 1984. *Computers in language learning.* Reading, Mass: Addison-Wesley.
Another excellent introduction to CALL and programming.

Kenning, M. & M. Kenning. 1983. *An introduction to computer-assisted language teaching.* Oxford: Oxford University Press.
A general introduction to CALL, with an emphasis on BASIC programs.

Leech, G. & C. N. Candlin. 1986. *Computers in English Language Teaching and Research.* London: Longman.
A collection of papers that has received very good reviews.

Underwood, J. 1984. *Linguistics, computers and the language teacher: a communicative approach.* Rowley, Mass: Newbury House.
Underwood's book covers CALL from a communicative perspective.

Wyatt, D. 1984. (ed.) *Computer-assisted language instruction.* New York: Pergamon Press
A good collection of articles on CALL.

Wyatt, D. 1984. *Computers and ESL.* Orlando: Harcourt Brace Jovanovich
Introduction to the use of computers; a good survey of CALL in specific areas of ESL.

Glossary of Computer Terms

account name The name by which a computer knows you. Your account name may be similar to your first or last name. Alternatively, it may have a completely different form, such as zonker or bzybee. Not usually applicable for microcomputers

address A string of characters that must be typed to send electronic mail to a user. The address usually consists of a user name followed by the name of the

computer on which the account is valid. The parts of an address are often separated by symbols like @ or %. An example of an address is BARLOW@csli.stanford.edu

alphanumeric keys All the number and letter keys.

application, application programs Programs which allow the user to make use of the computer without a knowledge of programming. Some common application programs are word processors and data base managers.

authoring language Software that facilitates the development of computer-based courses.

boot (noun, verb) A term for starting up a microcomputer. Booting consists of turning the computer on and inserting the system software.

cell The basic unit of the grid making up a spreadsheet page. Each cell can contain a value.

character A character is a single element recognized by the computer or printer. There are various types of characters, including letters, numbers, symbols (e.g. & and #), and invisible characters (space, tab, return). In addition to these kinds of text characters, there are also control characters such as *ctrl c*.

command key A special key that is used to give a command to the computer. Two common command keys are the control key and the escape key.

control key A key which is used in combination with other keys to give commands to the computer. Often labelled "ctrl."

courseware Software for courses.

crash (noun, verb) When a computer stops working unexpectedly, it is said to crash. Usually applies to large computers.

cursor An indicator on the screen that shows where text that is entered will appear.

data A collection of information, either textual or numeric. Often a distinction is made between the data, i.e. the information manipulated by a program, and the program itself. The word "data" may also refer to a set of discrete pieces of information such as numeric values. In this sense it is used in opposition to *text*, which refers to material written in a natural language such as English.

data base A store of data organized in a standard format.

data base manager An application used to create a data base. Also called a data base management program.

delete To remove data (characters, words, paragraphs) or files. Deleted elements can sometimes be retrieved.

down Not working. A computer or printer that is not operational and hence not available to users is said to be down.

electronic mail (email) Messages transmitted via computer.

enter key See return key.

field Parts of a record in a data base. For example, a data base may name and address fields.

file Text or data stored as a unit and identified by a label called the **file name**.

floppy disk A form of permanent memory storage for microcomputers, generally in the form of a flat flexible disk encased in cardboard or hard plastic. Floppy disks may hold software, such as word-processing programs, or data, such as a user's files.

format (noun, verb) 1. (referring to disks): To add (electronic) lines to a new disk so that it can be written to and read from by a computer. 2. To format text (e.g., a paragraph or a whole file) is to alter the shape or layout of the text so that it conforms with settings for such things as line spacing, margins, page length, etc.

hard copy A printed copy of a file.

hardware Physical machinery such as monitors, system units, printers, keyboards, etc. Often used in opposition to software, which refers to programs.

justify To make the margin of a text straight rather than ragged.

mainframe A large, time-sharing computer that supports numerous users simultaneously.

menu A table or list of options that the user can choose from. The options represent the possible commands that the computer can carry out.

microcomputer A small computer containing a microprocessor on a single chip. An example is an IBM PC.

Computers and ESL

modem From MOdulator-DEModulator. A device for making a connection between a terminal and a remote computer over telephone lines.

monitor The part of the computer or terminal which contains a screen on which data is presented to the user. A monitor is somewhat similar in appearance to a television set. Other names for it are visual display unit (VDU) and CRT.

mouse An input device which can be used to position the cursor on the screen or to give commands. The mouse is manipulated by moving it across a surface and by "clicking", or pressing its buttons.

online Refers to the existence of a live connection between a central computer and some peripheral hardware or software. For example, for a terminal or printer to be online, there must be a functioning electronic pathway that links it to the main computer.

outliner An applications program designed to allow the user to write headings or notes in a hierarchically structured form. Sometimes called idea processors.

peripherals The components other than the central system unit of a computer. Common peripherals include monitors, keyboards, printers and hard disks.

permanent storage The storage of data or software on magnetic materials such as floppy disks and tapes.

pointer An image, often in the form of an arrow, which appears on the screen. The pointer can be used to give commands by selecting choices from a menu. Its position on the screen is often controlled by manipulating a mouse.

program 1. (noun) A set of instructions written in a computer language such as Pascal or Lisp. 2. (verb) To write instructions that make the computer do something.

programming language A language such as BASIC, Pascal, Prolog or Lisp, which can be translated (by special programs) into a code that the computer understands.

prompt A special character (e.g., @, >, or %) on the screen that indicates that the computer is ready to receive a command.

public domain software Software which is not produced commercially and which can be freely copied.

read The computer reads data or software by transferring it from a magnetic storage medium, such as a disk, to the computer's internal memory.

record Information about an individual item stored in a data base. A record is organized into a set of fields representing the different classes of information stored. For example, for a data base which stores information about local restaurants, each restaurant will be given its own record. Information about location, type of food, etc. will be stored in fields of the record.

reform (noun, verb) A word processing command which causes the text to fit in between the margins. When the reform command is given, lines of text which are too long for the screen or page will be broken up, and lines that are too short will be filled out with text from following lines.

return key A key that used to send a command to the computer or to start a new line. Also called the enter key.

search A command that locates a particular string (sequence) of characters in a file. Also, the process of carrying out a search.

search and replace A command which finds instances of a characters or words in a file and replaces them with other characters or words.

scroll Files are often too long to be seen all at once. Scrolling is like turning pages; it brings text above or below the screen into view.

software The programs or instructions that make the computer carry out desired tasks.

spelling checker A program used to find spelling and typographical errors in a text file.

spreadsheet A program that stores a set of data in grid form and allows the user to carry out calculations on the data.

temporary memory Memory that relies on a continuous flow of electricity for its maintenance. If power is lost or there is a break in an electrical connection, then the information in temporary memory is lost. Sometimes called temporary storage. Contrast *permanent storage*.

terminal A keyboard and monitor that are connected to a remote computer by wires.

time-sharing computer A computer that divides its processing power among several users at once. The computer devotes small packets of time to each user; all users, however, appear to have constant access to the computer.

value The number (or sometimes word or date) contained in a cell in a spreadsheet.

window A rectangular box that appears on the screen to give information or display data. Windows are often controlled by the user; they can be opened and closed, moved around, and changed in size or shape. More than one window can be present on the screen at once.

word processor An applications program that allows the user to write text.

wordwrap A convenient feature available on many word processors. Wordwrap automatically moves words to the following line when the right margin has been passed. This means that the user does not need to enter a return at the end of each line; the return key needs to be pressed only at the end of a paragraph.

workstation A small powerful computer with a large graphics screen.

write To transfer data from the temporary memory in the computer to an electronic medium, such as a disk, for permanent storage. Contrasts with *read*.

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